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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/724,264

Applicant(s)

JENSEN ET AL.

Examiner

Maryam Monshipouri

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Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 December 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1, 4, 5, 7-9, 13-16, 19 and 21-27 is/are pending in the application.
- 4a) Of the above claim(s) 13, 15, 16, 19, 21 and 22 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 4-5, 7-9, 14, 23-27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

Claims 2-3, 6, 10-12, 17-18, 20 have been canceled. Claims 1, 4-5, 7-9, 14, and newly presented claims 23-24, 27 are still at issue and are present for examination. Claims 13, 15-16, 19, 21-22, 25-26 are withdrawn as drawn to non-elected invention.

Applicants' arguments filed on 12/27/07, have been fully considered and are deemed to be persuasive to overcome some of the rejections previously applied. Rejections and/or objections not reiterated from previous office actions are hereby withdrawn.

With respect to traversal of restriction requirement, applicant once again argues that the key of this invention is that applicant has discovered that a mutation on the conserved histidine of a naturally occurring proteorhodopsin provides a proteorhodopsin mutant with improved optical properties,. Such technical feature was not taught in any prior art. Further according to applicant claim 1 has been amended to recite a naturally occurring proteorhodopsin or a homolog thereof having at least 90% identity and La Rosa (previously cited by examiner) fails to teach such specific technical feature.

Therefore, in view of applicant restriction requirement should be reconsidered.

These arguments were fully considered but again were found **unpersuasive**. This is because as stated in the previous office action the phrase "conserved histidine residue" in claim 1 and its dependent claims remains unclear (see 112 second rejection below). Since said phrase is unclear, the special technical feature of this invention, even though applicant has recited some structural information into base claim 1, is unclear and for said reason restriction remains.

Applicant is reminded that this office action is Final. If applicant, at this stage of prosecution still has unresolved issues with respect to lack of unity he/she is encouraged to pursue his/her objections through the commissioner's office.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1, 4-5, 7-9, 14, 23-27 remain rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention, according to previous office action. In traversal of this rejection applicant argues the following:

(1) in page 3, lines 19-20 applicant has provided some examples of conserved histidine residues.

(2) Figures 3-1-3-8 depict an alignment of amino acid sequences of 81 proteorhodopsin variants. The bold "H" indicates the position of conserved histidine, which corresponds to H75 of Bac31A8. Such conserved amino acid residues can affect the conformation of the protein in relation to proteorhodopsin protein.

These arguments were fully considered but were found **unpersuasive**.

In response to applicant's **first** argument applicant is reminded that examples cannot be relied upon to define the phrase "conserved histidine residue" in claim 1 and its dependent claims (4-5, 7-9, 14, 23-27). Applicant must provide a clear and explicit definition for said phrase in order to overcome this rejection.

With regards to applicant's **second** argument, applicant is reminded that scope of currently amended claim 1 is even broader than before. Proteorhodopsin mutants of claim 1 currently require a mutation in a "conserved histidine" residue within a sequence that has 90% identity to homologs of naturally occurring proteorhodopsin. As indicated previously, it is unclear how much structural homology must be retained within the homologs of naturally occurring proteorhodopsin such that they still qualify as proteorhodopsin. Therefore "the phrase "homologs thereof" at the end of claim 1 is unclear. Further, even if said phrase at the end of claim 1 was clear, applicant has failed to teach how to find the "conserved histidine residues" in such homologs. As applicant is well aware, the term "homolog" embraces deletion variants of naturally occurring proteorhodopsin. Therefore, the position of conserved histidine in such deletion mutant can no longer be at those positions indicated in Figure 3 (wherever they will be).

Furthermore, applicant refers to The bold "**H**" in Figure 3. The examiner neither can find any bold letters in said figure nor can see H75 in Bac31A8 in said figure. The position 75 of Bac31A8 amino acid sequence is occupied by "T". Hence, the examiner remains confused as to which "conserved residues" applicant is referring to in said figure. Applicant is requested to review Figure 3 in the disclosure and refer the examiner to the page wherein said bold or conserved residues are shown.

Claims 1, 4-5, 7-9, 14, 23-27 remain rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The phrase "having at least 90% identity" in claim 1 (and its dependent claims 4-5, 7-9, 14, 23-27) is unclear. It is

indefinite whether said identity must be retained relative to a genus of naturally occurring proteorhodopsins from all sources and species as for example shown in Figure 3, or must be retained relative to that from Marine eubacteria only. Applicant is reminded that if he/she is referring to the genus of proteorhodopsins, no consensus amino acid sequence is provided such that such percentage identity could be determined. Therefore, currently said phrase is meaningless. Appropriate clarification is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1, 4-5, 7-9, 14, 23-27 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention according to previous office action. In traversal of this rejection applicant refers to Figure 3 wherein the list of 81 proteorhodopsin sequences and "conserved histidine residues" (see 112 second above) are shown and indicates that he/she has provided a large representative number of species and therefore he/she had possession the claimed product at the time of filing.

This argument was also fully considered by again was found **unpersuasive**. Applicant is reminded that in claim 1 (and its dependent claims 4-5, 7-9, 14, 23-27)

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applicant is no longer claiming a genus of optically improved mutants of naturally occurring proteorhodopsins but mutants of 90% homologs of homologs of naturally occurring proteorhodopsin from any source and species. Given the breadth of the claims applicant can appreciate that a list of full-length amino acid sequences of 81 proteorhodopsins, which in contrast to applicant's view, are not almost identical to each other, fails to provide sufficient species to define the board and enormous genus claimed and for said reason this rejection remains.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claim 1, 25-27 remains rejected under 35 U.S.C. 102(e) as being anticipated by La Rosa et al. (cited previously). In traversal of this rejection applicant argues that La Rosa et al. discloses a plant protein that displays only 7.6% identity with SEQ ID NO:3 and 22.4% local similarity in a short sequence. When the sequence of cited art is aligned and compared with 81 naturally occurring proteorhodopsins in Figure 3, it is clear that La Rosa's protein is not a proteorhodopsin mutant with properties recited and therefore 102(e) rejection should be withdrawn.

These arguments were fully considered by were found **unpersuasive**. the examiner agrees with applicant that when aligning La Rosa's sequence with those of Figure 3, as mentioned previously, La Rosa's protein may not a naturally occurring proteorhodopsin mutant. However, instant claim 1 is no longer restricted to mutants of naturally occurring proteorhodopsins but is directed to mutants of 90% homologs of "homologs" (see the end of claims 1 and 25) of naturally occurring pereotorhodopsin and it is believed that La Rosa's sequence can be considered to at least 90% or 97% variant (homolog) of, for example, a "homolog" of naturally occurring proteorhodopsin having 1% sequence identity or similarity to said naturally occurring protein (i.e. SEQ ID NO:3). Therefore in view of the breadth of claimed products, the rejection remains.

No claim is allowed.

NOTE: SEQ ID NO:165 is free of prior art. Further, the prior art fails to teach or suggest such specifically claimed amino acid sequence. Hence, said sequence is also non-obvious.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Maryam Monshipouri whose telephone number is (571) 272-0932. The examiner can normally be reached on Tues.-Fri., from 7:00 a.m to 5:30 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kathleene Kerr Bragdon can be reached on (571) 272-0931. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Maryam Monshipouri/

Primary Examiner, Art Unit 1656
